CA3

Core Alignment Splicer

Fiber Instrument Sales, Inc.

- Fast Splice Time – SM 7s Quick Mode / 18s Heat Time
- Rugged 4.3" Tempered Glass LCD Touch Screen
- Typical 130 Cycles (Splice & Heat) / Single Battery (2 Batteries Standard with Kit)
- Perfect for use with FIS Cheetah Splice-On Connectors with Metal SOC Holder

CA3

Core Alignment Splicer

Fiber Instrument Sales, Inc.

Rugged 4.3" tempered glass LCD touch screen monitor

The smallest Core Alignment Splicer

Standard kit package with precision cleaver and two extended life batteries

The New CA3 Core Alignment Fusion Splicer is designed with the splice technician in mind. The CA3 offers fast splice and heating times, excellent environmental performance, and a standard kit package with precision cleaver and (2) extended life batteries. Users have the option of operating the unit with integrated hard keys, or a new intuitive 4.3" LCD (tempered glass) touch screen. Fast, low-loss splice performance and compatibility with FIS Cheetah Splice on Connectors make this fusion splicer perfect for premise and long haul OSP applications.

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Important

All users should read this manual before operating the CA3 Core Alignment Splicer. This manual is valid for the 1.17 software version.

Introduction

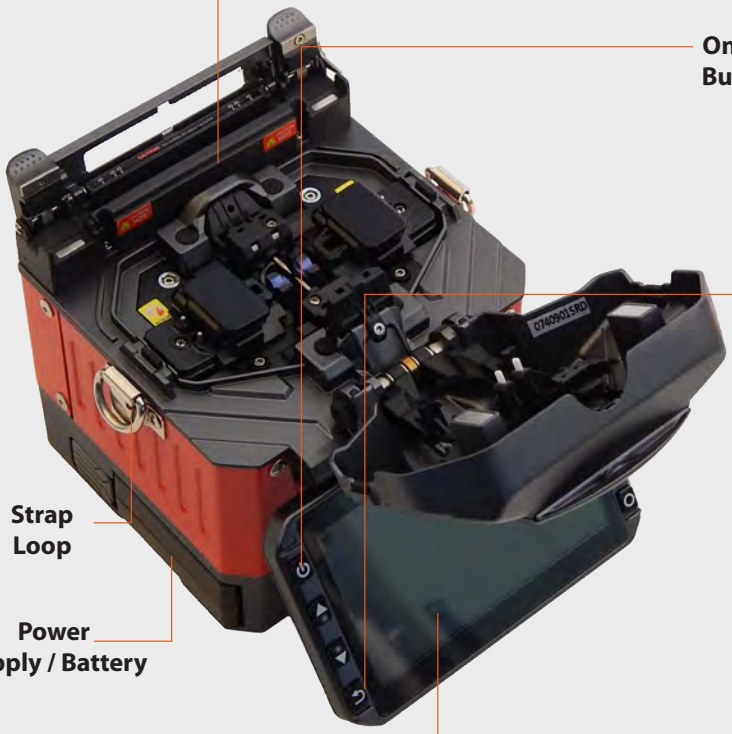
Thank you for choosing Fiber Instrument Sales CA3 3-axis Core Alignment Fusion Splicer. The innovative design and advanced technology of the CA3 brings you an unprecedented splicing experience and greatly reduces splicing and heating time. The unit's advanced estimate method and core alignment system helps ensure the accuracy of splice loss estimation. Its compact size and protective housing make it suitable for any operating environment. The graphical user interface and automatic splice mode also offer great convenience.

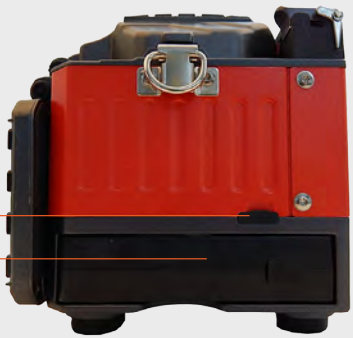
The goal of this manual is to make the user familiar and proficient in using this splicer. The manual explains the features, specifications, operation, and maintenance of the CA3, as well as important safety information.

Camera	High precision dual camera		
Display	4.3" wide color reinforced LCD		
Microscope	x150 : X&Y axis dual view		
	x300 : X axis single view		
	x300 : Y axis single view		
Power Supply	Splicer	AC 100~240V	
		50~60HZ	
		DC 9~14V	
	Li-ion Battery	DC 11.1V	
Data Capacity	Splice Mode	Optional Factory Presets	33
		Available User Edits	34
	Data Storage (splicing result)		3,000
Splice Speed	SM FAST mode		7 Sec.
	SM AUTO mode		9 Sec.

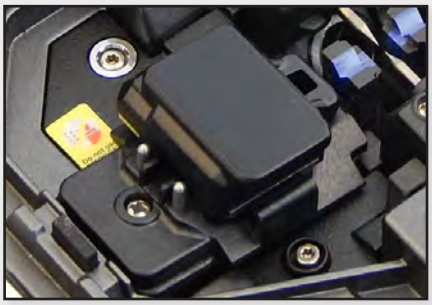
Heating Oven	Applicable Sleeve	Standard : 20, 25, 30, 35, 40, 60mm		
	Heating Time	8~900sec (Typical: 18 sec)		
	Cooling Time	0~180sec		
	Heat Mode	Factory pre-set		9
		User Edit		9
	Heating Block	Standard		1 (Pre-installed)
		SOC Customized		1 (In Package)
Applicable Fiber	Fiber Count : Single core			
	Fiber Type : SM(ITU-TG.652)/ DS(ITU-TG.653)/ NZDS(ITU-TG.655) / ITU-TG.657 / MM(ITU-TG.651)			
Applicable Cable	Fiber Count : Single core fiber in cable			
	Applicable Diameter : 0.25mm / 0.9mm / 2.0mm / 2.4mm / 3.0mm			
	Applicable buffer Diameter : Cladding diameter : 80~150μm, Coating Diameter : 100~3,000 μm			
Splice Loss	SM : 0.02dB			
	MM : 0.01dB			
	DS : 0.04dB			
	NZDS : 0.04dB			
	G.657 : 0.02dB			
Reliability	Operating Condition	Altitude		0~5,000M
		Humidity		0~95%
		Temperature		-15~60°C
		Wind Speed		15m/s
	Storage Condition	Humidity		0~95%
		Temperature	Splicer	-40~80°C
			Battery	-20~30°C

Splicer Description and Functions





How to change fiber holder



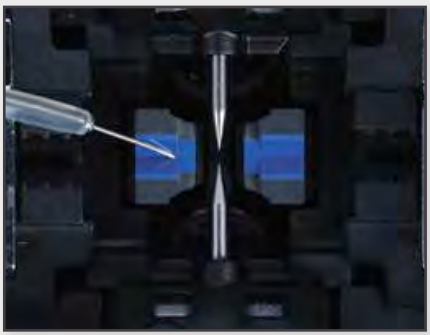
1) Unscrew the bolt
2) Take out the holder

CAUTION

1) The unscrewed bolts remain in the holder (Do not remove the bolts)
2) Do not screw down the holder too tight

Cleaning

V-Grooves



Test with fiber after cleaning with foam swab

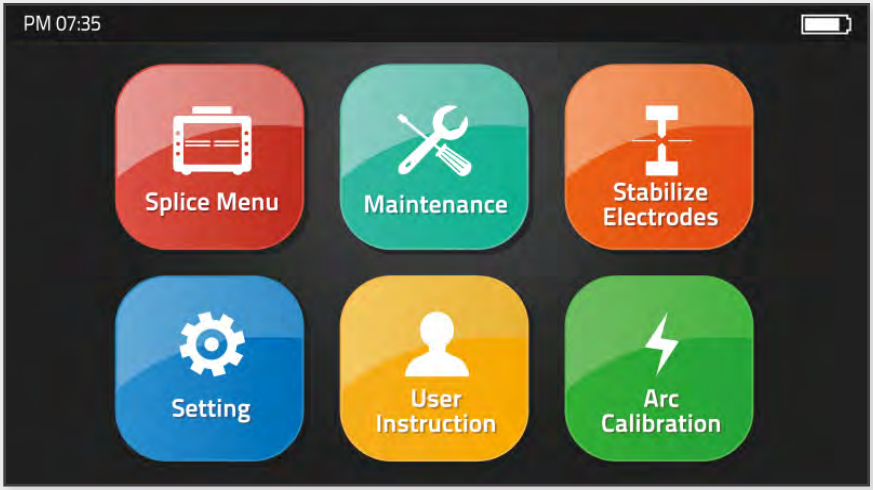
Lens

Mirrors

CAUTION

1) Do not disturb the Electrode Tips

Splice Programs



Button functions shown above

Stabilize Electrodes

In the event of sudden change in environmental conditions, the arc power sometimes becomes unstable, resulting in higher splice loss. Especially when the splicer is moved from lower altitudes to higher, it takes time for the arc power to stabilize. In this case, stabilizing electrodes will expedite the process of stabilizing the arc power. If many tests are needed to get the "Test ok" message during [Arc Calibration], that also suggests that you may need to stabilize the electrodes.

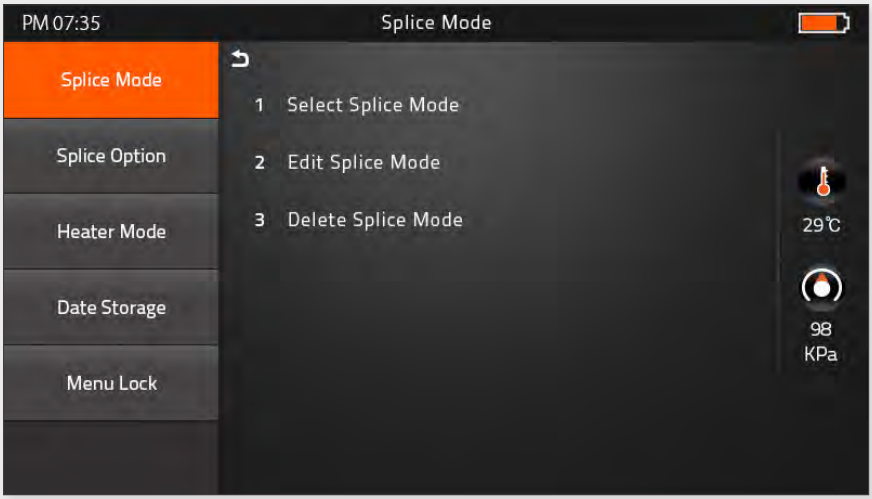
Arc Calibration

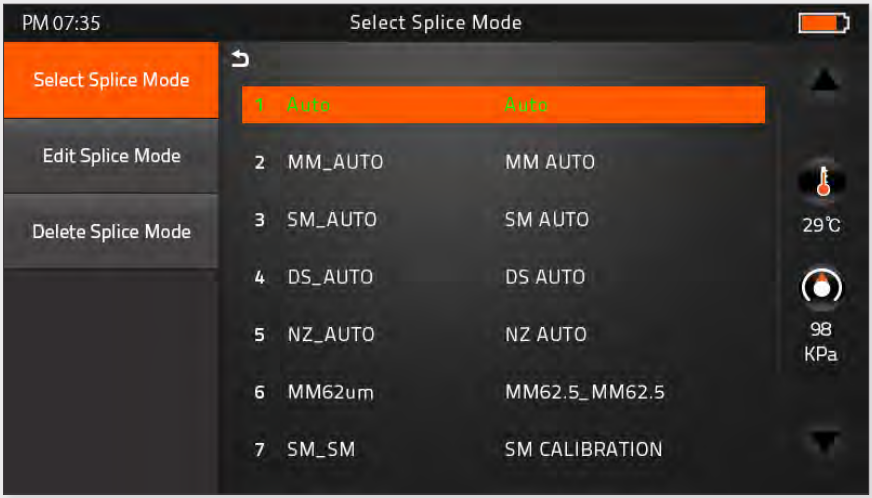
Atmospheric conditions such as temperature, humidity, and pressure are constantly changing, which creates variability in the arc temperature. This splicer is equipped with temperature and pressure sensors that are used in a constant feedback monitoring control system to regulate the arc power at a constant level. However, changes in arc power due to electrode wear and glass adhesion cannot be corrected automatically. Also, the center position of arc discharge sometimes shifts to the left or to the right. In this case, the fiber splicing position has to be shifted in relation to the arc discharge center. It is necessary to perform an arc power calibration to eliminate those problems.

Note : Performing the [Arc calibration] function changes the arc power "Factor" value. The factor value is used in the algorithm program for all splicing. The arc power value will not change in the splice modes.

Splice Menu

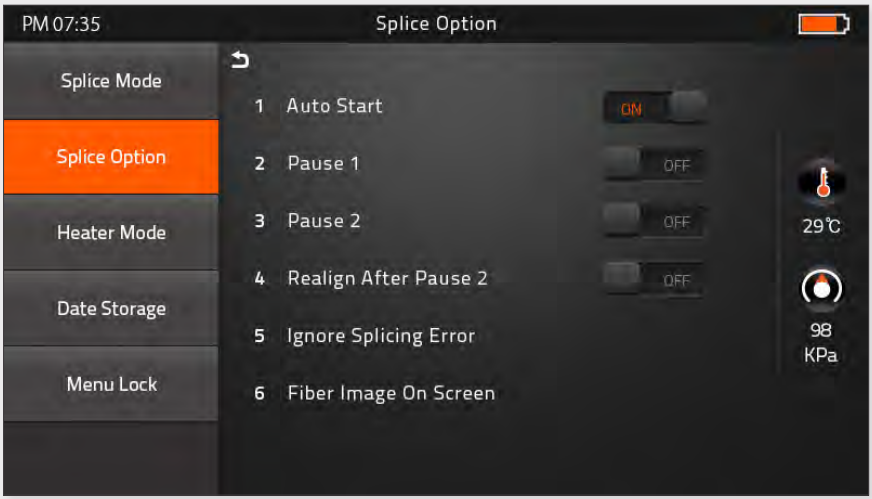
1.) Splice Mode





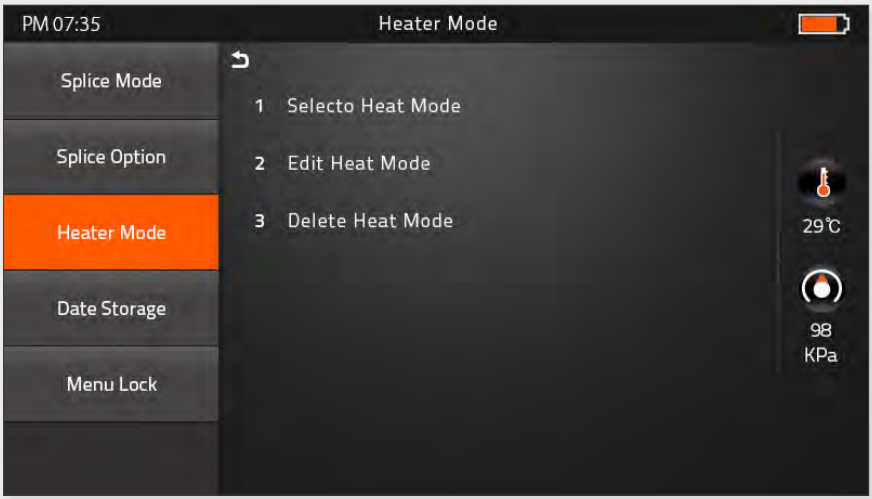
Select Splice Mode	Factory Preset : 33
Edit Splice Mode	User Edit : 33 Custom Build Splice Mode : 1
Delete Splice Mode	-

2.) Splice Option



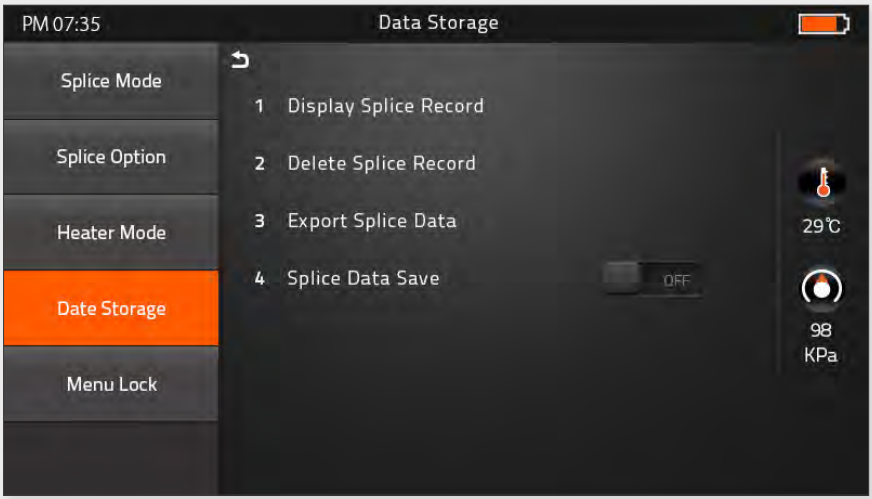
Auto Start	ON : Automatic splicing procedure
	OFF : Maunal splicing procedure
Pause 1	ON : Pause after the fiber gap position process
	OFF : Proceeding without the pause
Pause 2	ON : Pause after camera focus & axis alignment process
	OFF : Proceeding without the pause
Realign After Pause 2	ON : Automatically proceed realignment
	OFF : Proceeding without the pause
Ignore Splicing Error	'splicing error' message is not displayed
Fiber Image On Screen	Select display option for each splicing process

3.) Heater Mode



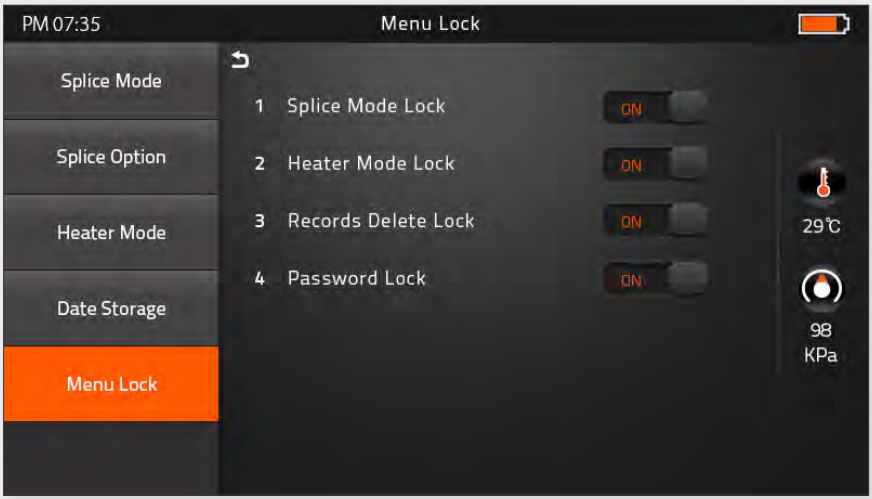
Select Heater Mode	Factory Preset : 9
Edit Heater Mode	User Edit : 9 Custom Build Splice Mode : 1
Delete Heater Mode	-

4.) Data Storage



Display Splice Record	Displays your detailed splice record
Delete Splice Record	Deletes your saved splice data
Export Splice Data	Downloads saved data (splice record or image)
Splice Data Save	ON : Automatic data saved * Image data is saved manually *
	OFF : Do not save splice record

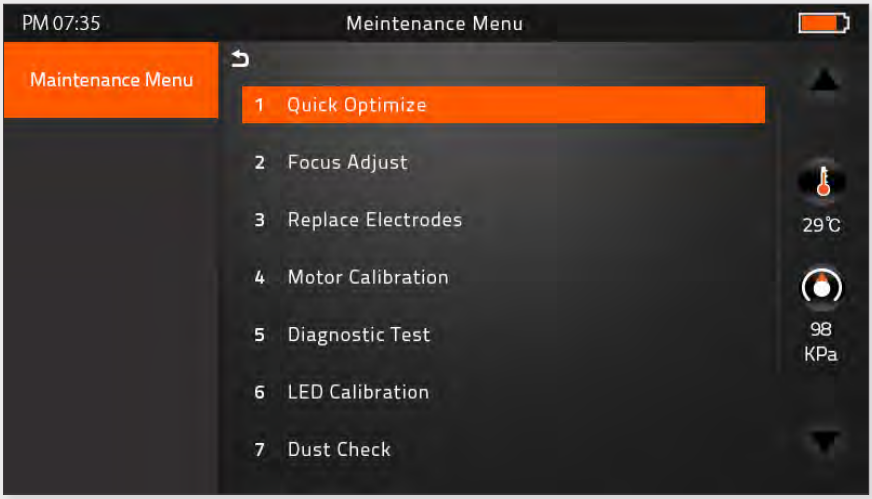
5.) Menu Lock



Splice Mode Lock	ON : Disable 'Splice Mode' edit
	OFF : Enable 'Splice Mode' edit
Heater Mode Lock	ON : Disable 'Heater Mode' edit
	OFF : Enable 'Heater Mode' edit
Records Delete Lock	ON : Disable 'Record Mode' edit
	OFF : Enable 'Heater Mode' edit
Password Lock	ON : Disable to change the password
	OFF : Enable to change the password

Maintenance

1.) Maintenance Menu



Quick Optimize

- Quick & Easy overall maintenance
- Automatic process 'Lens focus + moter calibration + fiber training"

Focus Adjust

- Finds the optimum position for "Press, Focus & Align Motor"

Replace Electrodes

- Instruction on how to replace electrodes
- It is highly recommended that you change the electrodes every 1,000 splices

Motor Calibration

- Automatically calibrates the speed of all six motors

Diagnostic Test

LED Calibration	Measures and adjusts the brightness of LED
Dust Check	Dust checking process
Motor Calibration	Automatically calibrates the motor speed
Arc Calibration	Automatically calibrates the Arc power

LED Calibration

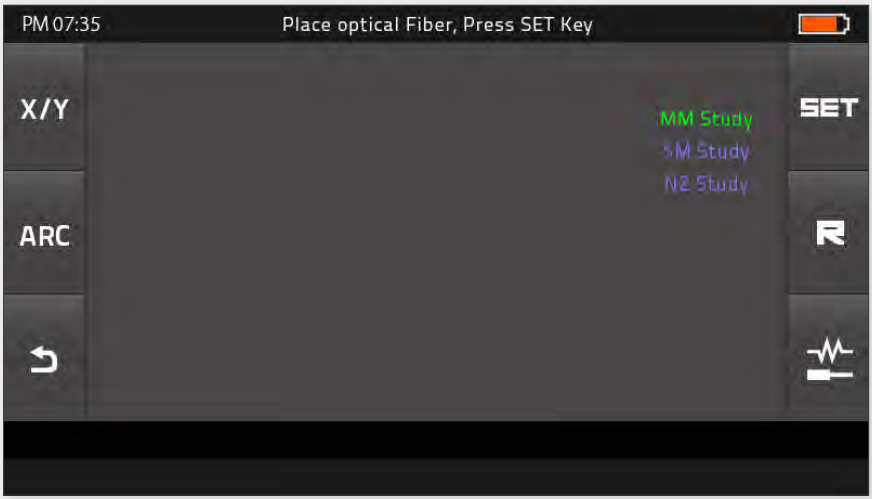
- Measures and adjusts the brightness of LED

Dust Check

- Detects dust and contaminants that can cause improper splicing. In order to find the optimized position for splicing, the splicer analyzes the fiber images being transmitted by the internal optical camera and LED. Dust or contaminants on the camera, lenses, or LED may cause improper splicing result.

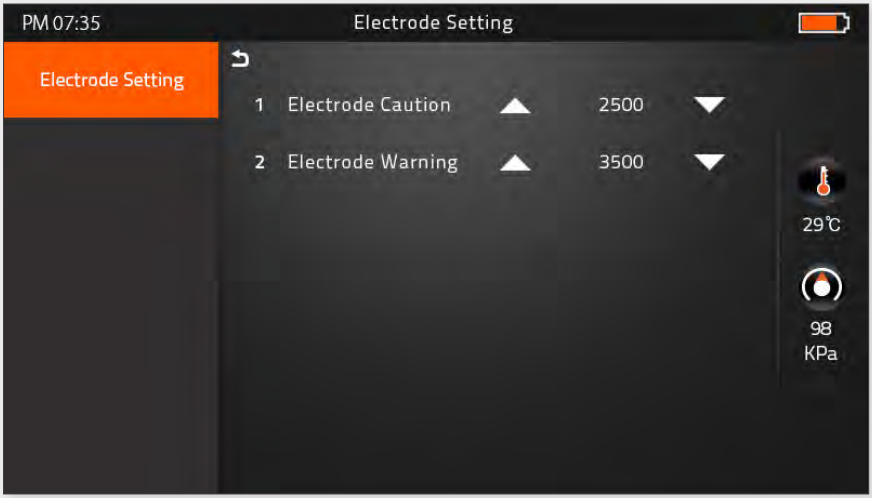
  Therefore, the dust check process is recommended when experiencing frequent splicing failure or high insertion loss.

Fiber Training



Automatic Fiber Recognition Program

Electrode Setting



Electrode Caution	Caution alarm will be displayed when it reaches the number of splicing cycles you set
Electrode Warning	Caution alarm will be displayed when it reaches the number of splicing cycles you set

Motor Drive

- This checks the operation status of 6 motors (L, R Press, X, Y Focus, X, Y Align).

Update Software

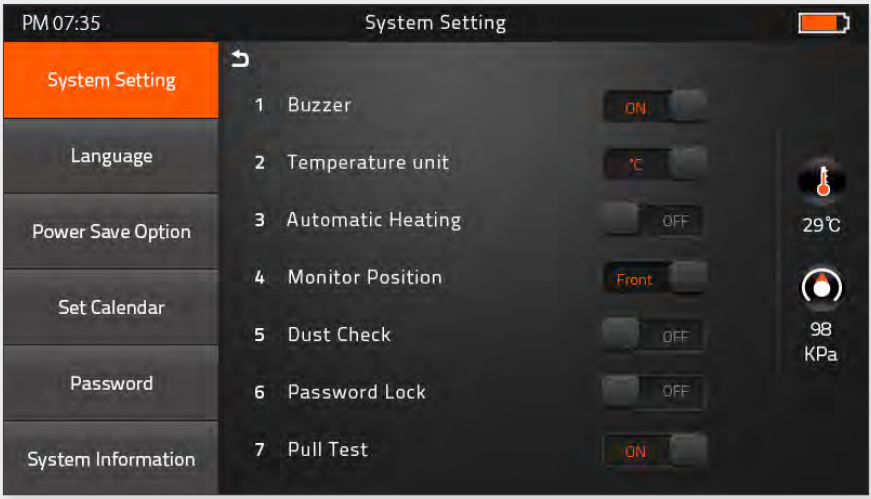
- Upgrade to the latest version.

Procedure

1	Prepare the USB device.
2	Download the latest version software to the USB.
3	Link to the Splicer (via link cable in the package).
4	Press "O' Button to proceed to update.
5	Device will reboot once it is done.

Setting

1.) System Menu



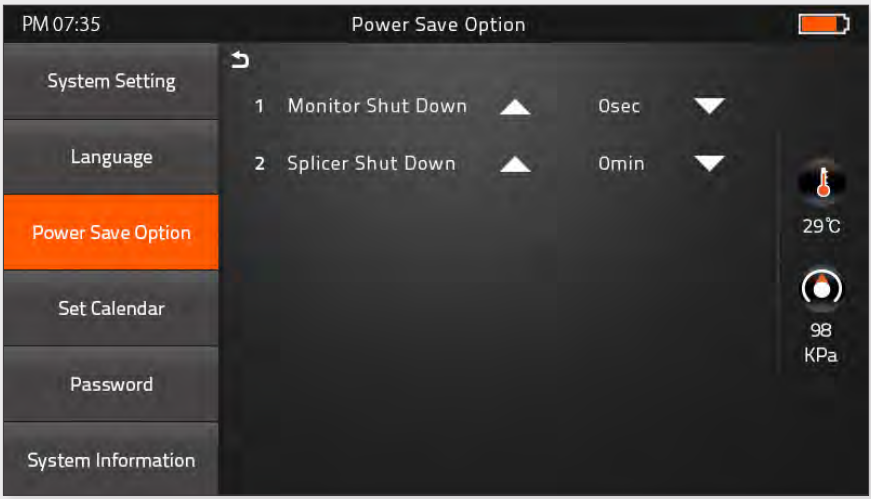
Buzzer	ON : Sound on OFF : Sound off
Temperature Unit	°C : Celsius °F : Fahrenheit
Automatic Heating	ON : Auto start OFF : Manual start
Monitor Position	Front : Normal direction display Rear : Opposite direction display
Dust Check	ON : Check the dust density OFF : Skip dust checking process
Password Lock	ON : Password is required to operate the device OFF : No password is required
Pull Test	ON : Automatic pull test processing after splicing OFF : Skip pull test process

2.) Language

Set your own language.

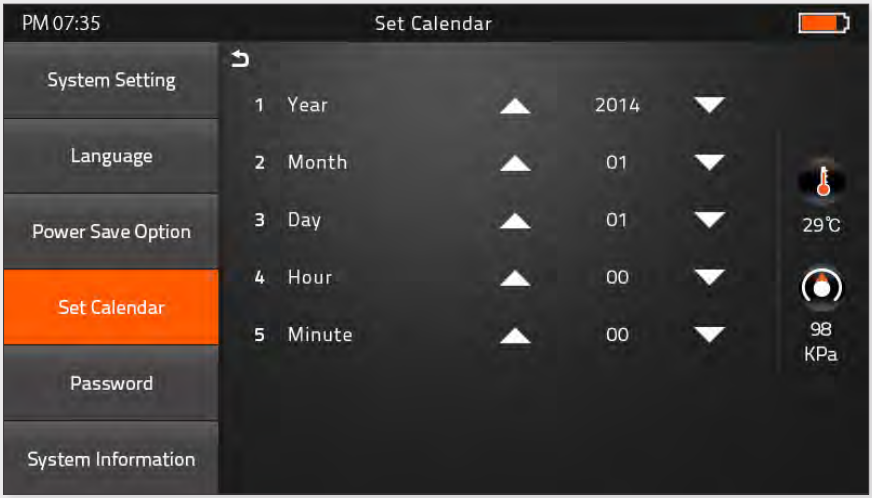
Languages Available	
繁体中文	Việt
English	العربية
한글	Español
Русский	Italiano
Deutsch	Português
Français	فارسی
ไทย	

3.) Power Save Option



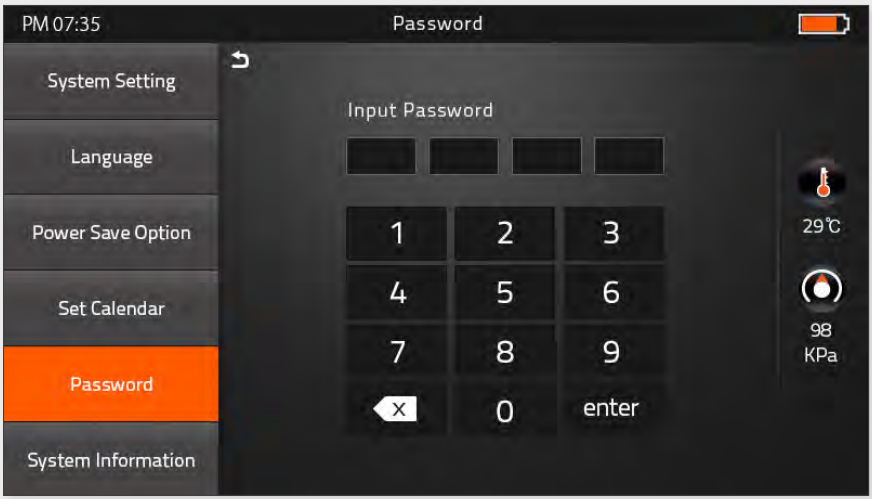
Monitor Shut Down	1.) If the splicer is inactive for the set period of time, the monitor will shut off and the splicer will enter standby mode 2.) System will be switched over to standby mode.
	Press the power button to resume (screen will be back on)
Splicer Shut Down	If no input during the time you set, the splicer will shut down to save power
	Press the power button for 2 sec. to reboot the splicer

4.) Set Calendar



5.) Password

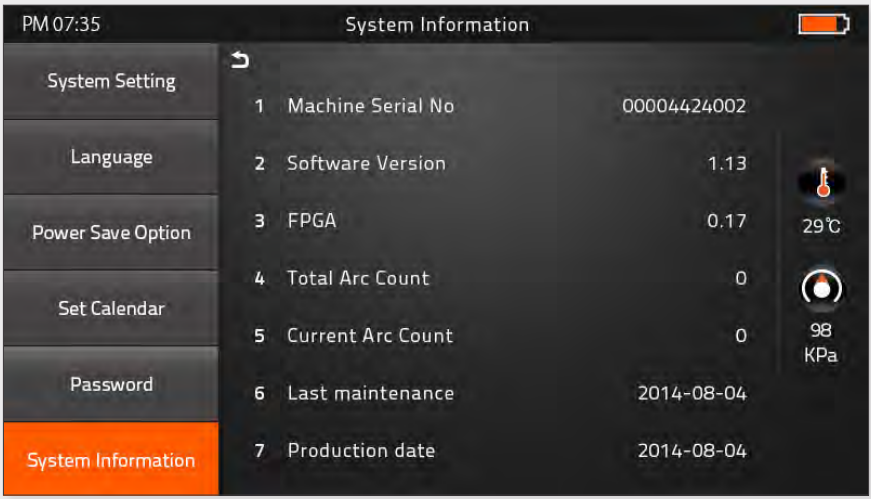
Change your password.



Procedure

1	Input 4-digit old password number
2	Input new 4-digit number for new password

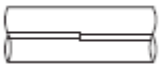
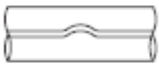
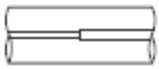
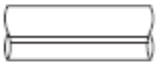
6.) System Information



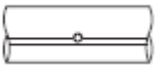
Machine Serial No.	Identification number of the splicer
Software Version	Software version being installed
FPGA	Field Programmable Gate Array version
Total Arc Count	Total number of Arc discharges
Current Arc Count	Current number of Arc discharges
Last Maintenance	Last maintenance date
Production Date	Manufacturing date
Sales Region	Authorized country for sales
Product OEM	Manufacurer name

Appendix 1

Splice Loss Increase: Reason and Solution Table

Symptom	Name	Reason	Solution
	Core Axial Offset	Dust on v-groove or fiber clamp chip	Clean v-groove and fiber clamp chip
	Core Angle	Dust on v-groove or fiber clamp chip	Clean v-groove and fiber clamp chip
		Bad fiber end-face quality	Check if fiber cleaver is in good condition
	Core Step	Dust on v-groove or fiber clamp chip	Clean V-groove and fiber clamp chip
	Core Curve	Bad fiber end-face quality	Check if fiber cleaver is in good condition
		Pre-fuse power too low or pre-fuse time too short	Increase [Pre-fuse power] and/or [Pre-fuse time]
	MFD Mismatch	Arc power too low	Increase [Arc power]
	Combustion	Bad fiber end-face quality	Check the cleaver
		Dust still present after cleaning fiber	Clean fiber thoroughly or increase [Cleaning arc time]

(Continued on next page)

	Bubbles	Bad fiber end-face quality	Check if fiber cleaver is in good condition
		Pre-fuse power too low or pre-fuse time too short	Pre-fuse power too low or pre-fuse time too short
	Separation	Fiber gap too wide	Perform [Motor calibration]
		Pre-fuse power too high or pre-fuse time too long. Contaminated electrodes.	Decrease [Pre-fuse power] and/or [Pre-fuse time]
	Fat	Fiber gap too wide	Decrese [Overlap] and perform [Motor calibration]
	Thin	Arc power not adequate	Perform [Arc calibration]
		Some arc parameters not adequate	Adjust [Pre-fuse power], [Pre-fuse time] or [Overlap]
	Line	Some arc parameters not adequate	Adjust [Pre-fuse power], [Pre-fuse time] or [Overlap]

Note: A vertical line sometimes appears at the splice point when MM fibers, or dissimilar fibers (different diameters) are spliced. This does not affect splice quality, such as splice loss or tensile strength.

Appendix 2

If error messages appear during the splicing process, apply the solutions provided below. If the problem still remains, please contact us.

Error Message	Reason	Solution
L Fiber Place Error	The fiber end-face is placed on the electrode centerline, or beyond it	Press the "Reset" button. Reload the fibers, making sure fiber end faces are between V-groove and the center position of the electrodes
R Fiber Place Error		
Propulsion Motor Overrun	The fiber is not set correctly at the bottom of the V-groove, which results in fiber offsets beyond motor formation range	Press the "Reset" button and then reposition the fiber at the bottom of the V-groove
Propulsion Motor Trouble	Motor might be damaged	Consult FIS technical support
Failed to Find The Fiber End-face.	The fiber is not set correctly at the bottom of the V-groove	Press the "Reset" button and then re-position the fiber correctly at the bottom of the V-groove
No Arc Discharge	Arc Discharge does not occur	Confirm the electrodes are in proper position; replace electrodes
Motor Overrun	The fiber is not set correctly at the bottom of the V-groove	Press the "Reset" button and then reposition the fiber at the bottom of the V-groove
Cannot Find the Edge of The Cladding	The fiber is not set correctly at the bottom of the V-groove	Press the "Reset" button and then reposition the fiber at the bottom of the V-groove

(Continued on next page)

Find Wrong Fiber Edges	There's dust on the fiber surface	Re-prepare the fiber ; Clean the lens and protector mirror and then redo "Dust check"
Unidentified Type of Fibers	Shock occurred to the splicer during the splicing process	Execute "Motor Calibration." If the problem still exists, please contact FIS technical support
Contact of Fiber End-faces	Fiber overlap	Adjust overlap parameter
	Motor is not calibrated	Calibrate and maintain the motor
Focus Motor Overrun	The fiber is not positioned properly	Press the "Reset" button and then reposition the fiber correctly
	There's dust or dirt on the fiber surface	Prepare the fiber again
	There's dust or dirt on the fiber surface	Execute [Dust check] after the lenses and LEDs are cleaned
Fibers Mismatch	The two fibers are of different type	It may result in a large splice loss if you continue to splice. Please use the proper splice mode corresponding to the fibers
Large Cleave Angle	Bad fiber end-face	Check the condition of the fiber cleaver. If the blade is worn, rotate the blade to a new position or change to a new blade, and then re-prepare the fibers
	[Cleave limit] is set too low	Increase the [Cleave limit] to an adequate limit. (standard: 3.0°c)
Large Core Angle	[Core angle limit] is set too low	Increase the [Core angle limit] to an adequate limit. (standard:1.0°c)
	Dust or dirt is on the V-groove or the fiber clamp	Clean V-groove and clamp chip. Prepare the fibers and re-load them
Focus Error	Too large axial offset. (0.4μm)	Re-prepare the fibers
	The motor is not calibrated	Execute [Motor calibration]

(Continued on next page)

Dust Error (fiber core)	There's dust or dirt on the fiber surface	Prepare the fiber again
	The lens or LEDs are coated in dust	Execute the dust check after cleaning the lenses and LEDs
	Cleaning Arc time is too short	Set the cleaning arc time to be 180ms
	It is difficult to identify the fiber core by using the method of core alignment to splice	It is difficult to identify the fiber core by using MM splice mode to splice
	There's dust or dirt on the fiber surface	Prepare the fiber again
	There's dust or dirt on the fiber surface	Execute the [Dust check] after the lenses and LEDs are cleaned
	Cleave angle limit is too low	Increase the cleave angle limit to a decent value. (standard value: 3.0°C)
Fat Fiber	Fiber overlap	Adjust overlap parameter
	Motor is not calibrated	Calibrate and maintain the motor
Thin Fiber	Arc power too low	Execute [Arc Calibration]
	The level of pre-discharge is too high	Decreased pre-discharge or pre-discharge time
	Insufficient overlap	Adjust overlap parameter

Appendix 3

Questions and Troubleshooting

Power does not turn off when pressing On / Off button

Press and hold the key until the LED color changes from green to red.

Few splices can be made with a fully charged battery pack

If the power saving function is not enabled [System setting], battery power degrades quicker. Always enable this function to conserve power. If degradation occurs (memory effect), or if the battery pack is stored for an extended period of time, completely discharge it. After discharge completion, recharge the battery pack. If the battery pack has reached the end of its service life, install a new battery pack. The battery pack uses a chemical reaction; battery capacity decreases at low temperature, especially lower than 0° C.

Error message appears on monitor

Please refer to appendix II.

Inconsistent splice loss / High splice loss

Clean the V-grooves, fiber clamps, wind protector mirrors, and objective lenses. Replace the electrodes. Please refer to Appendix I. The splice loss varies according to the cleave angle, arc conditions and fiber cleanliness.

Monitor suddenly turned off

The monitor will turn off after an extended period of splicer inactivity if the power saving function is enabled. Press any key to return the splicer to its normal state.

Splicer power suddenly turned off without "Low battery" message

The monitor will turn off after an extended period of splicer inactivity if the power saving function is enabled. Press any key to return to the normal state.

Identify fiber errors in AUTO mode

AUTO mode is applicable for SM, MM, NZ fiber. Errors may occur when splicing special fibers.

Mismatch between Estimated splice loss and Actual splice loss

The estimated loss is a calculated loss, so it can be used for reference only. The optical components of the splicer may need to be cleaned.

Fiber protection sleeve does not shrink completely

Extend the heating time.

Method to cancel heating process:

Press the Heat key to cancel the heating process, which should cause the LED light to go out.

Fiber protection sleeve adhered to heating plate after shrinking

Use a soft tip object to push and remove the sleeve.

Forgot password

Please contact your sales agent.

No arc power change after [Arc calibration]

The splicer is calibrated and adjusted for the specific arc power selected. The displayed arc power in each splice mode does not change.

Forgot to load fibers while executing a specific function

Return key is invalid. Open the wind protect shield, load prepared fibers in the splicer, and press "Set" to continue or press "Reset."

Upgrading failure

When users use the "New" U-disk to upgrade, the splicer may not be able to correctly identify the upgrade file. In this case, you need to re-plug the U-disk, and restart the splicer. Check if the upgrade file name and the format are correct. If you cannot solve the problems, please contact your sales representative.

Other

Contact FIS for instructions and available products for use with the FIS Cheetah Splice-On Connector.

NOTES